

REMARKS

This application has been reviewed in light of the Office Action dated June 5, 2002. Claims 1-17 remain pending. Claims 1, 2, 5-9, 12, and 15 are in independent form. Favorable reconsideration is requested in view of the following comments.

Claims 1-11 have been indicated as being allowable. The Examiner is thanked for allowing those claims.

Claim 15 was rejected under U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,728,435 (Geis et al.). Claims 16 and 17 were rejected under U.S.C. § 103(a) as being unpatentable over *Geis et al.* in view of U.S. Patent No. 5,470,265 (Nomura et al.).

Without conceding the propriety of these rejections, Claims 15-17 have been canceled, thereby rendering the rejections moot.

Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Geis et al.* in view of U.S. Patent No. 6,410,144 (Dearnaley et al.). Claims 13 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Geis et al.* in view of *Nomura et al.* and further in view of *Dearnaley et al.*

Claim 12, the remaining rejected independent claim, is directed to an electron-emitting device that comprises a carbon film composed chiefly of carbon and an electrode electrically connected to the carbon film. Sulfur is contained in the carbon film in a rate of 1 mol% or more with respect to carbon. These features improve the electron emission efficiency of the device.

Fig. 3 of Geis et al., relied on in the Office Action, depicts an arrangement in which a cathode 10 is a set of electron-emissive pedestals 40 with sharpened tips. Pedestals 40 are interconnected by way of an electrically conductive layer 42. Items 44 and 46 represent an electronegative-matter layer and an electropositive-metal layer (Col. 7, lines 48-56). Col. 4, lines 27-39 states that carbon along a surface 14/16 (Figs. 1a-1d) preferably consists substantially of diamond, and that the diamond can be conductively doped with sulfur.

As the Office Action recognizes, *Geis et al.* is not seen to teach or suggest an electron-emitting device as recited in Claim 12, comprising a carbon film composed chiefly of carbon and an electrode electrically connected to the carbon film, and specifically, sulfur contained in the carbon film in a rate of 1 mol% or more with respect to carbon.

The Office Action asserts that "Dearnaley, in the same field of diamond films containing sulfur, discloses the use of 27% sulfur to carbon by weight in order to provide a more durable surface (Column 3 lines 24-28) . . . [, and t]hus, it would have been obvious . . . to incorporate sulfur in concentrations of 27% by weight into the electron emitting elements disclosed by Geis to form an electron-emitting element that is advantageously more durable." Applicants respectfully disagree with this assertion for the following reasons.

In Applicants' view, *Dearnaley et al.* is seen to be directed to a prior known problem that an alumina film formed for protecting a surface of an aluminum substrate is porous and therefore suffers from an intrusion of corrosion from the porous portion, thereby corroding the alumina (*see, e.g.*, Col. 2, lines 6-17). According Col. 2, lines 20-33 of *Dearnaley et al.*, amorphous carbon with improved lubricity, or a precursor, is used to

seal the porous portion of the alumina on the surface of the aluminum substrate. To improve the lubricity, a sulfur component is added by 27 wt% to 31 wt% to the precursor, to form the amorphous carbon.

However, in Applicants' view, nothing has been found, or pointed out, in *Dearnaley et al.*, that would teach or suggest using a diamond-like carbon film in an "electron-emitting device", let alone any motivation for doing so. Indeed, *Dearnaley et al.* is seen to be devoid of any disclosure whatsoever regarding an electron-emitting device. As such, there would have been no reason why one skilled in the relevant art who was faced with the same problem (e.g., a need to improve the electron emission efficiency of an electron-emitting device) confronted by Applicants at the time of their invention would have even consulted *Dearnaley et al.*, let alone been motivated to combine that reference with *Geis et al.* in the manner proposed in the Office Action, whether or not *Dearnaley et al.* be deemed to teach a "more durable" surface of anodized aluminum. Indeed, the Examiner's suggestion to combine *Geis et al.* and *Dearnaley et al.* is believed to constitute impermissible hindsight reasoning, since it proposes to combine the references to achieve a result (an electron-emitting device having features as defined in Claim 12) gleaned solely from Applicants' disclosure, seemingly without any sufficient teaching, suggestion, or motivation in the prior art to do so. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051-52, 5 USPQ 2d 1434, 1438 (Fed. Cir. 1988) (it is impermissible to reconstruct the claimed invention from selected pieces of prior art absent some suggestion, teaching, or motivation in the prior art to do so); *In re Fritch*, 972 F.2d 1260, 23 USPQ 2d 1780 (Fed. Cir. 1992) ("[I]t is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is

rendered obvious. . . . This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.'").

Moreover, since Claim 12 is directed to an electron-emitting device, whereas *Dearnaley et al.* relates merely to lubricious diamond-like carbon coatings - - a non-analogous art, the Examiner's reliance on that reference is believed improper, since it is well established that "[i]n order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ 1443, 1445 (Fed. Cir. 1992). *See also* MPEP 2141.01(a). Lubricious diamond-like carbon coatings used for the purpose (prevention of corrosion in a lumina film) disclosed in *Dearnaley et al.* are not believed to meet either of these criteria.

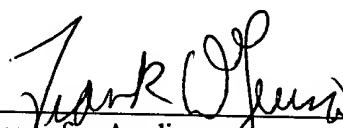
For all of the foregoing reasons, Applicants respectfully submit that the Examiner has failed to establish a prima facie case of obviousness against Claim 12, and thus the Section 103(a) obviousness rejection of Claim 12 should be withdrawn. Claim 12 is deemed to be clearly patentable over *Geis et al.* and *Dearnaley et al.*, whether considered separately or in combination.

Claims 13 and 14 each depend from Claim 12, and also are believed to be patentable over those references, whether considered separately or in combination, at least for the reason that each depends from a patentable base claim.

In view of the foregoing remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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